

REMARKS

Applicants respectfully request further examination and reconsideration in view of the arguments set forth fully below. In the Office Action mailed August 1, 2006, claims 1-29 have been rejected. In response, the Applicants have submitted the following remarks. Accordingly, claims 1-29 are still pending. Favorable reconsideration is respectfully requested in view of the remarks below.

Rejections Under 35 U.S.C. §102

Claims 18-23 and 26-29 have been rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent No. 6,169,919 to Nearing et al. (hereinafter Nearing). The Applicants respectfully disagree with this rejection.

Within the Office Action, it is stated that Nearing teaches a method comprising, among other elements, generating difference curves from the estimates of the amplitude of beat-to-beat alternation, and subsequently displaying the difference curves. The Applicants point out that the text of column 12, lines 22-28, and the corresponding Fig. 11B, provide the only teachings for calculating the information for plotting for the user. Nearing provides no teaching whatsoever as to generating difference curves from the estimates or calculations of the odd median and the even median beats.

In contrast to the teachings of Nearing, the processor 58 **calculates a difference curve for each stored odd and even median complex by sampling a number of corresponding data points of each medium complex and determining the difference.** Every data point of the absolute difference curve can represent an amplitude value. The amplitude value can be calculated as an absolute value of the difference between the corresponding data points of the odd and even median complexes of an odd and even median complex pair. Utilization of an absolute difference can provide similar results regardless if the first beat is taken as an odd beat or as an even beat (present invention, paragraph 20). As described above, Nearing does not teach generating difference curves from the estimates of the amplitude of beat-to-beat alternation in the electrocardiogram signal.

The independent claim 18 is directed to an apparatus for displaying T-wave alternans data from electrocardiogram comprising a display, and means for producing a spatiotemporal representation of the T-wave alternans data on the display, wherein the producing means are configured to compare a plurality of odd data points with a plurality of even data points corresponding to the T-wave alternans data to obtain a plurality of difference points, and further configured to display the plurality of different points as a difference curve. As described above, Nearing does not teach displaying the plurality of difference points as a difference curve. For at least these reason, the independent claim 18 allowable over the teachings of Nearing.

The independent claim 19 is directed to a method of quantifying alternation in an electrocardiogram signal having a plurality of beats comprising receiving electrocardiogram data representing the electrocardiogram signal, calculating odd median complexes for odd beats in the electrocardiogram data, calculating even median complexes with the even median complexes to obtain estimates of the amplitude of beat-to-beat alternation in the electrocardiogram signal, generating difference curves from the estimates of the amplitude of beat-to-beat alternation; and displaying the difference curves as a spatiotemporal representation of the beat-to-beat alternation in the electrocardiogram signal. As described above, Nearing does not teach comparing the odd median complexes with the even median complexes to obtain estimates of amplitude of beat-to-beat alternation in the electrocardiogram signal and generating difference curves from the estimates of the amplitude of beat-to-beat alternation. For at least these reason, the independent claim 19 is allowable over the teachings of Nearing.

Claims 20-23 and 26-29 are dependent upon the independent claim 19. As discussed above, the independent claim 19 is allowable over the teachings of Nearing. Accordingly, claims 20-23 and 26-29 are also allowable as being dependent upon allowable base claim.

Rejections Under 35 U.S.C. §103

Claims 1-17 and 24-25 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,823,213 to Norris et al. (hereinafter Norris) or Nearing in view of U.S. Patent No. 6,967,652 to Nubling et al. (hereinafter Nubling). The Applicants respectfully disagree with this rejection.

Within the Office Action it is stated that Norris and Nearing disclose substantially as claimed except the processor assigns data points a “color” corresponding to amplitude and displays the data points in a difference curve and a plurality of curves in a temporal alignment.

The Applicants submit that Norris actually teaches an implantable medical device and method using integrated T-wave alternans analyzer. **Furthermore, and more importantly, the Applicants point out that like Nearing, Norris, nor their combination does not teach comparing the plurality of odd data points with the plurality of even data points to generate a plurality of difference data points and displaying the plurality of different data points as a difference curve. Furthermore, Norris does not teach generating a plurality of difference curves.**

The independent claim 1 is directed to a method of displaying alternans data of an electrocardiogram signal, the electrocardiogram signal having a plurality of odd beats and a plurality of even beats comprising calculating an odd median complex for at least one of the plurality of odd beats, the odd median complex having a plurality of odd data points, calculating an even median complex for at least one of the plurality of even beats, the even median complexes having a plurality of even data points, comparing the plurality of odd data points with the plurality of even data points to generate a plurality of difference data points, assigning each one of the plurality of difference data points a color corresponding to an amplitude, displaying the plurality of difference data points as a difference curve and generating a plurality of difference curves and displaying the plurality of difference curves in a temporal alignment.

As described above, neither Norris, Nearing, Nubling nor their combination teach comparing the plurality of odd data points with the plurality of even data points to generate a plurality of difference data points, and displaying the plurality of difference data points as a difference curve, nor generating a plurality of difference curves. For at least these reason, the independent claim 1 is allowable over the teachings of Norris, Nearing, Nubling and their combination.

Claims 2-12 are dependent upon the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of Norris, Nearing, Nubling and their combination. Accordingly, claims 2-12 are also allowable as being dependent upon an allowable base claim.

The independent claim 13 is directed to an apparatus for displaying alternans data of an electrocardiogram signal, the electrocardiogram signal having a plurality of odd beats and a plurality of even beats comprising a display, and a processor that produces a representation of the alternans data, the processor calculating an odd median complex for at least one of the plurality of odd beats, the odd median complex having a plurality of odd data points, calculating an even median complex for at least one of the plurality of even beats, the even median complex having a plurality of even data points, comparing the plurality of odd data points with the plurality of even data points to obtain a plurality of difference data points, assigning each one of the difference data points a color corresponding to an amplitude, displaying the plurality of difference data points as a difference curve on the display and generating a plurality of difference curves and displaying the plurality of difference curves on the display in a temporal alignment. As discussed above, neither Norris, Nearing, Nubling nor their combination teach comparing the plurality of odd data points with a plurality of even data points to obtain a plurality of difference data points, and displaying the plurality of difference data points as difference curve on the display, nor generating a plurality of difference curves. For at least these reason, the independent claim 13 is allowable over the teachings of Norris, Nearing, Nubling, and their combination.

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Claims 14-17 are dependent upon the independent claim 13. As discussed above, the independent claim 13 is allowable over the teachings of Norris, Nearing, Nubling and their combination. Accordingly, claims 14-17 are also allowable as being dependent upon an allowable base claim.

Claims 24-25 are dependent upon the independent claim 19. As discussed above, the independent claim 19 is allowable over the teachings of Nearing. Accordingly, claims 24-25 are allowable as being dependent upon an allowable base claim.

For these reasons, Applicants respectfully submit that all of the claims are now in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, they are encouraged to call the undersigned at 414-271-7590 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
ANDRUS, SCEALES, STARKE & SAWALL, LLP

By Christopher M. Scherer
Christopher M. Scherer
Reg. No. 50,655

Andrus, Sceales, Starke & Sawall, LLP
100 East Wisconsin Avenue, Suite 1100
Milwaukee, Wisconsin 53202
Telephone: (414) 271-7590
Facsimile: (414) 271-5770